

Children of women who smoked during pregnancy at increased risk of becoming smokers: study

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New research has revealed that prenatal exposure to nicotine increases the vulnerability to nicotine self-administration in adolescent mice. The results support the hypothesis that adolescents with prenatal nicotine exposure are more likely to start smoking earlier than their peers and that they are also more susceptible to the addictive effects of nicotine, especially as a result of stress and peer pressure. The study performed with mice is part of a project researching the behavioural and molecular mechanisms of nicotine addiction. The research project was carried out under the Academy of Finland's Research Programme on Substance Abuse and Addictions.

The key observation made by the Finnish and Russian researchers in the project was that adding [nicotine](#) to the drinking water of pregnant mice led to differences between the control and nicotine-exposed offspring in terms of nicotine self-administration. Treating the dams with nicotine during the prenatal period increased the frequency of self-administration in the offspring compared to the control group, even at lower doses.

The study also examined the receptor-level combined effects of opioids (morphine and morphine-related compounds) and nicotine. A receptor is a human protein to which endogenous and exogenous compounds bind. Once the receptors are activated, they trigger a number of intracellular signals. The compounds that bind to a receptor may also alter or turn off the receptor signalling. The present study was conducted using cell lines

that express different subtypes of nicotinic receptors. Nicotine attaches to these receptors and activates them.

The results of the research project show that [morphine](#) and its related [compounds](#), which normally attach to their own receptors, also bind to nicotinic receptors, causing altered nicotine responses. This provides a possible explanation for the common concurrent use of nicotine and other substances. The results may also pave the way for the development of new medication used to treat both smoking and drug addiction.

More information: Chistyakov V, Patkina N, Tammimäki A, Talka R, Salminen O, Belozertseva I, Galankin T, Tuominen RK, Zvartau E (2010) Nicotine exposure throughout early development promotes nicotine self-administration in adolescent mice and induces long-lasting behavioural changes. *Eur J Pharmacol*, 640 : 87-93

Talka R, Salminen O, Whiteaker P, Lukas RJ, Tuominen RK (2010) Interactions of nicotine, methadone and buprenorphine in 3H-epibatidine-binding and calcium fluorometry in nAChR-containing cell lines. Program No. 236.11 Neuroscience Meeting Planner. San Diego, CA : Society of Neuroscience, 2010, Online

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